

Evaluate the clinical manifestations, laboratory findings, and treatment approaches in patients with hypertriglyceridemia-induced acute pancreatitis

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Summary

Objective: This study aimed to evaluate the clinical manifestations, laboratory findings, and treatment outcomes in patients diagnosed with hypertriglyceridemia-induced acute pancreatitis (HTG-AP). **Subject and method:** A retrospective, cross-sectional analysis was conducted on 132 patients with HTG-AP. Data on demographics, clinical symptoms, laboratory results, and treatment methods were collected within the first 24 hours of admission. **Result:** The mean age of patients was 44.7 ± 8.0 years, with a male predominance (76.5%). The most affected age group was 40-60 years (68.2%). Abdominal pain was a universal symptom, observed in 100% of patients. The median triglyceride level was 41.58mmol/L, with the highest recorded value reaching 205mmol/L. Common laboratory findings included leukocytosis and hyponatremia. The mortality rate was low at 0.8%. Antibiotics were administered to more than 60% of patients, while less than 30% received pain management medication. The most common triglyceride-lowering intervention was insulin (39.4%), followed by plasmapheresis (12.9%). **Conclusion:** The findings emphasize the need for cautious use of antibiotics to prevent resistance and highlight the importance of early recognition and appropriate treatment strategies in managing HTG-AP.

Keywords: Acute pancreatitis, hypertriglyceridemia, clinical, laboratory, treatment.

I. BACKGROUND

Hypertriglyceridemia is one of the three most common causes of acute pancreatitis, accounting for 1–14% of cases¹. Hypertriglyceridemia-induced acute pancreatitis (HTG-AP) is an inflammatory condition that affects the pancreas and surrounding areas, and can lead to serious complications. In severe cases, the mortality rate can reach 30% if patients have not undergone appropriate treatment². The incidence of HTG-AP has recently increased due to an increase in contributing factors, including metabolic disorders, diabetes, lifestyles, and stress³.

Several studies demonstrated the clinical characteristics of AP and its treatment⁴. However, these data concerning HTG-AP have been limited, especially in Vietnam. Furthermore, the treatment of HTG-AP, including medical methods, insulin, and plasmapheresis for lowering TG levels is still controversial. Furthermore, only a few studies have reported the proportion of patients with HTG-AP treated with antibiotics, medications for pain control, and TG-lowering medications in patients with HTG-AP⁵. If there is information about the characteristics of HTG-AP in our local population, it can help doctors predict the severity outcomes and preventive methods for this disease.

Therefore, we conducted this study to evaluate the clinical manifestations, laboratory findings, and

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treatment results in patients with hypertriglyceridemia-induced pancreatitis.

II. SUBJECT AND METHOD

2.1. Participants

Study population: This study included all patients diagnosed with hypertriglyceridemia-induced acute pancreatitis admitted to the 108 Military Central Hospital, Hanoi, Vietnam, from January 2020 to December 2022.

Inclusion criteria:

The diagnosis of HTG-AP¹⁵ is defined as follows:

Acute pancreatitis was dignosed on the basic of the revised Atlanta criteria (2012).

Serum triglyceride level > 11.3mmol/L.

Age above 18 years.

Exclusion criteria:

Acute pancreatitis due to other causes, including gallstones, alcohol, autoimmune diseases, cancer, hypercalcemia, trauma, or medication use.

Patients with incomplete data.

2.2. Method

Study design: This was a retrospective, cross-sectional study.

Sample size: All patients meeting the inclusion and exclusion criteria were included.

Study definitions: The severity of acute pancreatitis was classified according to the 2012 revised Atlanta criteria¹⁵:

Mild: No organ failure, and no local/systemic complications.

Moderate-Severe: Transient organ failure (resolves within 48 hours) and/or local or systemic complications without persistent organ failure.

Severe: Persistent organ failure involving one or more organs.

Data collection: Data were retrieved from the electronic medical records of patients with HTG-AP. The study collected demographic, clinical, laboratory, and treatment data from the first 24 hours of hospitalization for all eligible patients.

Statistical analysis: Data analysis were performed using Epi Info version 7. Continuous variables were expressed as mean ± standard deviation (SD) or as median with interquartile range (IQR), while categorical variables were shown as counts and percentages. Categorical data were analyzed using Chi-square and Fisher's exact tests. For continuous variables, independent t-tests or Mann-Whitney U tests were applied, depending on data distribution. A p-value of <0.05 was considered statistically significant.

III. RESULT

This study included 132 patients with HTG-AP and we recorded the following results:

Table 1. The baseline characteristics of the study group (n = 132)

Characteristics	Frequency (n)	Percentage (%)
Age group (years)		
< 40	36	27.3
40-60	90	68.2
> 60	6	4.5
Male	101	76.5
Comorbidities		
Diabetes mellitus	18	13.6
History of AP	67	50.8
Hypertension	7	5.3
History of dyslipidemia	42	27.3

Table 1 shows that the most common age group of patients with HTG-AP was 40-60 (68.2%). A few patients > 60 years old had HTG-AP (4.5%). Compared with females, males (76.5%) was predominant. The most common comorbidity was a history of AP (50.8%), followed by a history of dyslipidemia (27.3%).

Table 2. Characteristics of clinical manifestation of the study group at admission

Characteristics	Frequency (n)	Percentage (%)
Abdominal pain	132	100
Nausea	79	59.8
Vomiting	52	39.4
Abdominal distension	74	56.1
No gas and no bowel movement	62	47
Fever	7	5.3
Dyspnea	5	3.8
Abdominal tenderness on palpation	130	98.5
Abdominal guarding sign	7	5.3
Left Costovertebral tenderness	12	9.1
Abdominal shifting dullness	2	1.5
Grey- Tuner/Cullen	0	0

Our findings revealed that the most frequent clinical symptom of a history of present illness in a patient with HTG-AP was abdominal pain (100%), followed by nausea (59.8%) and abdominal distention (56.1%). There were no patients with Grey-Tuner/Cullen syndrome.

Table 3. Characteristics of the laboratory findings of the study group (n = 132)

Value	Median (IQR*)	Min-Max value
Triglyceride (mmol/L)	41.6 (25.3-65.5)	12.1-205.0
Cholesterol (mmol/L)	13.6 (10.8-17.6)	5.5-42.2
Amylase (U/L)	183.5 (87.3-484.0)	15-2262
Lipase (U/L)	522.6 (256.3-1315.2)	57.40-7583.60
WBC (x10 ⁹ /L)	13.0 (10.2-15.3)	1.0-26.9
HCT (%)	42.3 (38.5-45.2)	29.1-72.0
Platelet (x10 ⁹ /L)	240.5 (200.3-284.5)	97-431
Glucose (mmol/L)	7.58 (5.3-12.1)	1.3-29.0
Natri (mmol/L)	127 (122-130)	97-141
Potassium (mmol/L)	3.7 (3.3-4.1)	2.7-5.3
Creatinine (umol/L)	67.5 (50.0-79.5)	11.0-307.0
Ure (umol/L)	4.1 (2.7-5.3)	1-65.0

The median triglyceride level was high, with the highest being 205mmol/L. Our results also revealed leukocytosis and hyponatremia in patients with HTG-AP.

Table 4. Severity and complications of the study group (n = 132)

Characteristics	Frequency (n)	Percentage (%)
Atlanta 2012		
Severe	10	7.6
Moderate severe	96	72.7
Mild	26	19.7
Necrotic pancreatitis	24	18.2
Acute kidney injury	21	15.9
Diabetic ketoacidosis	7	5.3
Sepsis	1	0.8
Acute respiratory distress syndrome	1	0.8

Table 4 showed that according to the revised Atlanta 2012, moderate-severe AP accounted for the highest percentage 72.7%. Sepsis and acute respiratory distress syndrome (ARDS) accounted for only 0.8% of cases.

Table 5. Treatment characteristics of the study group (n = 132)

	Frequency (n)	Percentage (%)
Mortality	1	0.8
Ventilation	4	3
Vasopressor	2	2.5
Renal replacement	8	6.1
Antibiotics	89	67.4
One antibiotics	68	51.5
Two antibiotics	17	12.9
Three antibiotics	5	3.8
Medications: pain control	39	29.5
Paracetamol	5	3.8
Opioids	22	16.7
Antispasmodics	12	9.1
Lowering-TG medications	32	24.2
Fibrate	17	12.9
Statin	10	7.6
Combined fibrate-statin	10	7.6
Lowering-TG interventions		
Plasmapheresis	17	12.9
Insulin	52	39.4

Our findings revealed that the mortality rate was low (0.8%). The proportion of antibiotics used was higher than 60%, while medications for pain control were less than 30%. The conservative method (47.7%) was the most common lowering-TG intervention, while plasmapheresis was only 12.9%.

IV. DISCUSSION

Our study results revealed a mean age of 44.7 ± 8.9 years, which is quite similar to that reported in the study by Thong VD et al., in which the mean age was 41.5 ± 9.7 years⁶. A prospective study of 400

consecutive cases of acute pancreatitis revealed that patients with HTG-induced acute pancreatitis were younger (average age 44 years) than those with other causes of acute pancreatitis (average age 52 years)⁷. Among the HTG-AP patients, those aged 40-60 years composed the most common group (68.2%), followed by 27.8% of patients aged < 40 years and only 4.5% those aged > 60 years. Another descriptive cross-sectional study, which combined both retrospective and prospective methods and included 157 patients with HTG-induced acute pancreatitis, found that the most common age group was between 30 and 50 years. Specifically, in this study, 49.1% of patients were aged 40-60 years, whereas only 3.8% were over 60 years⁶. In our study, percentage of men was more than three times greater than that of women. Another study reported that the ratio of males to females was 4.8/1⁸. The occurrence of HTG-AP in middle-aged adults, with a male predominance, may be due to factors that increase triglycerides more in middle aged individuals and more in men than in women, such as alcohol abuse, metabolic diseases, and a previous history of acute pancreatitis. However, studies are needed to clarify this relationship in the Vietnamese population.

Clinically, our findings revealed that all hospitalized patients experienced abdominal pain, whereas nausea occurred in 59.8% of patients. This result is similar to that of the study of Ho Thanh Nhat Truong, with abdominal pain occurring in 100% of patients and a vomiting rate of 54.6%⁹. In terms of the laboratory results, the average triglyceride concentration in our study was 41.58mmol/L, which is two times greater than that reported in the study of Orhan Sezgin et al. in 2015, in which the average concentration was 19.1mmol/L. This may be explained by the difference in diet between the two regions and the differences in baseline characteristics and severity between the two populations¹⁰. Leucocytosis is common in acute pancreatitis and reflects inflammation condition, whereas hyponatremia in HTG-AP patients in our study differed from that in patients with other

causes of AP. Excess triglycerides in a serum sample can displace water containing sodium, leading to pseudohyponatremia¹¹.

Regarding the treatment of patients with HTG-AP, our findings revealed that the mortality rate at discharge was lower (1 case, 0.8%) than that reported in the other studies of Vu Duy Thong and Zhu Cheng (4 cases, 2.6%, and 3 cases, 1.6%, respectively)^{6, 12}. This may be explained by a few more severe patients in our study than in other studies. Furthermore, in our study, a significant proportion of patients (81.5%) were used antibiotics, of whom 62.4% used only one antibiotic, followed by 17% who used two antibiotics and 1.5% who used three different types. A retrospective study involving 712 patients with acute pancreatitis revealed that 62% of them were prescribed antibiotics. Among these patients, 19.38% of the clinicians considered the indications inappropriate⁵. Furthermore, TG-lowering therapy, including statins and fibrates, is crucial in managing HTG-AP. Among these patients, 23.1% of patients were on TG-lowering medications: 11.3% used statins, 9.2% used fibrates, and only 2.6% were treated with a combination of both. When triglyceride levels fall below 1000mg/dL (11.3 mmol/L), these medications can effectively reduce fasting triglycerides to below 500 mg/dL¹³. Among the TG-lowering interventions in our study, conservative and insulin therapy were more common than plasmapheresis was (87.1% and 12.9%, respectively). Plasmapheresis may reduce TG levels quickly; however, the benefit of this method has not been confirmed on basic of evidence¹⁴.

There are several limitations in this study. First, general limitations of retrospective studies may include selection bias. Second, the number of patients in the study was small, especially severe patients.

V. CONCLUSION

Patients with hypertriglyceridemia-induced acute pancreatitis in our study were mostly middle-aged and predominantly male. Abdominal pain was the most common sign, followed by

nausea/vomiting and abdominal distension. The majority of patients had leukocytosis and hyponatremia. The proportion of antibiotics used in patients with HTG-AP was high. Therefore, doctors should be aware of the appropriate antibiotic indications to decrease antibiotic resistance and cost. Further studies are needed to clarify the efficacy of the conservative methods, including insulin infusion, compared with that of plasmapheresis in patients with HTG-AP.

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